# Pontics and the Edentulous Ridge

Donna N. Deines, DDS, MS

Resources: Shillingburg et al: *Fundamentals of Fixed Prosthodontics*
Rosenstiel et al, *Contemporary Fixed Prosthodontics*
Eissmann, H.F. in *Dental Laboratory Procedures: Fixed Partial* Dentures (Rudd, Morrow)
Chiche, G & Pinault, A: *Esthetics of Anterior Fixed Prosthodontics*

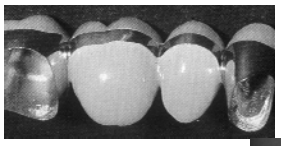
## Pontic Design and the Edentulous Ridge

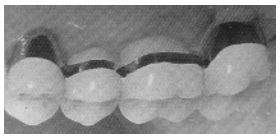
**Esthetic**
Appearance of replacement
"Emergence" from ridge
Space for porcelain

**Biologic**
Ease of cleaning
Patient comfort
Healthy tissue
Occlusion

**Mechanical**
Rigid: resist deformation / porcelain fracture
Strong connectors

## Pontic Materials and Design

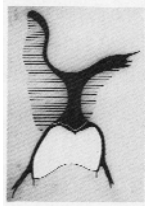




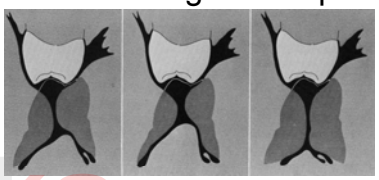
- Glazed porcelain
- Highly polished gold
- M-C finish line: not on edentulous ridge
- Acrylic / composite resin (porous) – poor surface
- Proper design most important



## Alveolar Ridge Resorption

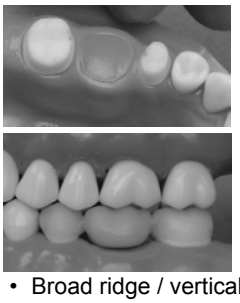


Eissmann, Harold F.



Normal Minimal Excessive

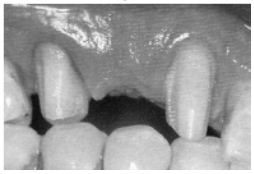
Edentulous space defined by its boundaries:
- Edentulous ridge
- Opposing occlusion
- Tongue and cheek

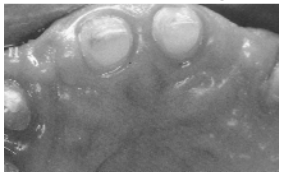


## Alveolar Ridge Resorption (Minimal)

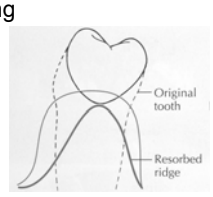
- Broad ridge / vertical height
  - Uncommon
  - Can compromise occlusocervical dimension →
    - decreased strength of restoration
    - limits restoration possibilities

## Changes in the edentulous ridge



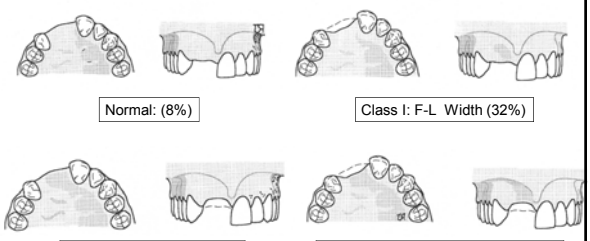


- Alveolar resorption and remodeling
  - Apical and facial resorption
  - Greater with trauma / periodontal disease
- Pontic or tissue modifications for esthetics / cleansability



## Residual Ridge Deformities

Siebert, JS (*Compend Contin Educ Dent* 4:437, 1983)



Normal: (8%)

Class I: F-L Width (32%)

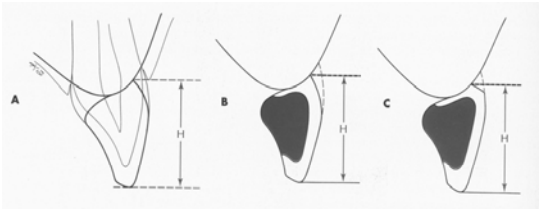
Class II: O-G Height (3%)

Class III: F-L and OG Height (56%)

Lateral resorption → narrow ridge
Vertical resorption → ridge height defect

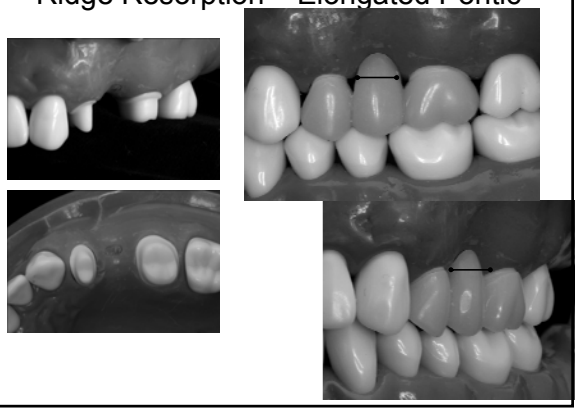
Shillingburg

## Pontic Contour Changes with Ridge Resorption




- A pontic should have the same incisogingival height as original (or contralateral) tooth.
- With resorption, the pontic becomes longer in order to contact the ridge concavity.
- *Contour must be blended smoothly to avoid a ledge at the cervical*.

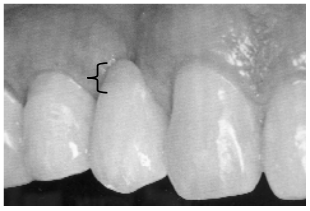
## Ridge Resorption – Elongated Pontic



## Esthetic Modification: Gingival Contour of Pontic

- Contour in apical ½ should approximate length of adjacent teeth.

## Esthetic Modification: Gingival Contour of Pontic



- Contour in apical ½ should approximate length of adjacent teeth.
- The facial surface must be altered to curve gently from the G-F angle to the middle of facial surface

## Esthetic Modification of Pontic Contour

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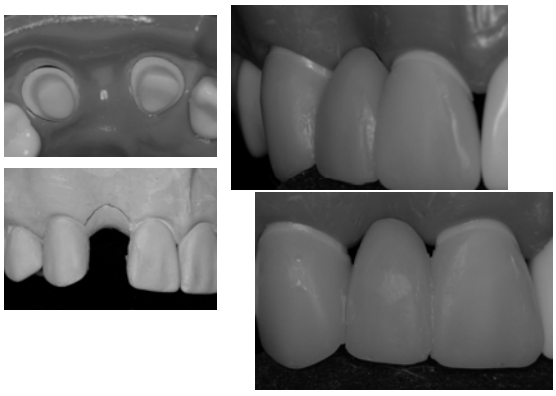
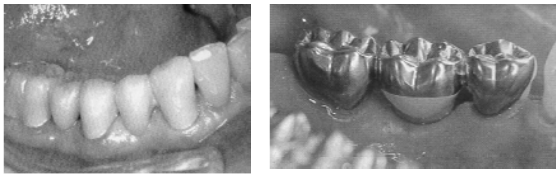
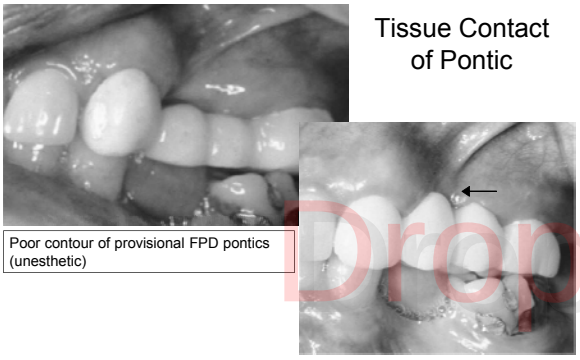


## Biological Considerations: Tissue Contact



- Any contact should be pressure-free
  - Tissue should not blanch
- Keratinized attached tissue
- No contact with ridge if possible or smallest possible area with convex pontic surface

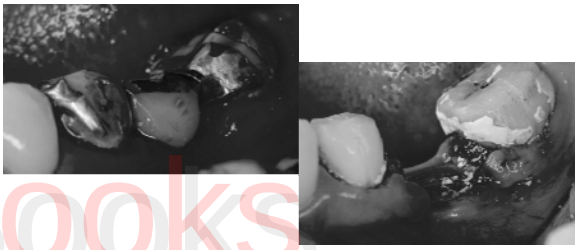
## Tissue Contact of Pontic



Poor contour of provisional FPD pontics (unesthetic)

Contact on non-keratinized mucosa / low frenum attachment must be adjusted to avoid ulceration.

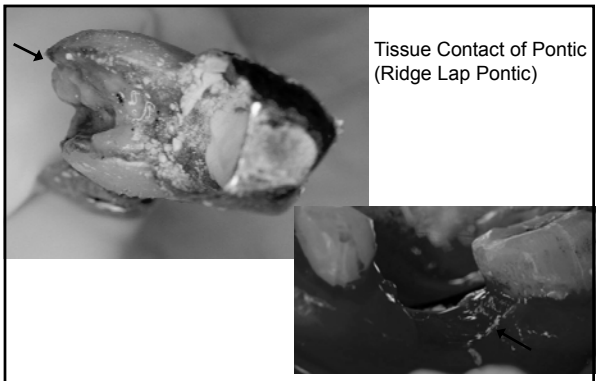
## Ridge-Lap and Tissue Impingement



- Pressure by pontic → tissue necrosis
- Keratinized tissue contact only
- Avoid non-keratinized tissue and frenum attachments.
- Floss should pass through without resistance.

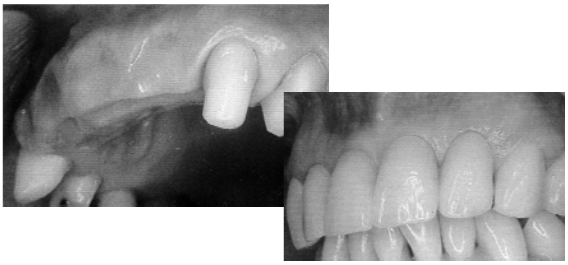


## Tissue Contact of Pontic (Ridge Lap Pontic)



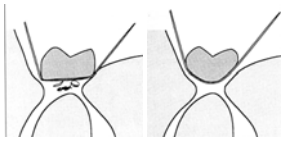
- Severe ridge lap of pontic prevents cleaning.
- Pontic pressure causes tissue ischemia and necrosis.

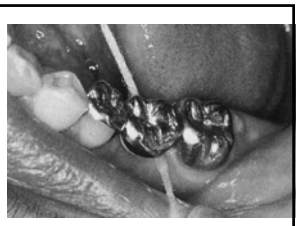
## Tissue Contact of Esthetic Pontics

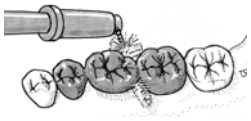


- Area of contact small and convex.
- No space between pontic and soft tissue of facial side of ridge
- Contact on attached keratinized gingiva only
- No pressure on the ridge

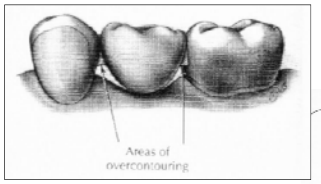
## Oral Hygiene

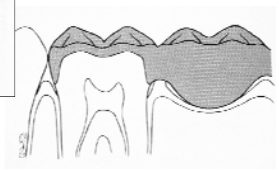






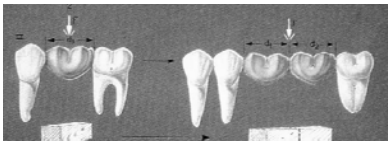
- Convex smooth surface of pontic
- Adequate gingival embrasures
- Patient education and hygiene aids
  - Floss threader; Super-floss / gauze; Proxy-brush; WaterPik



- Connectors and pontic contours must not impinge on gingival tissue → gingival inflammation / recession / necrosis.
- Yet there must be <u>adequate thickness for strength</u>
- Strength properties of materials
  - Metal / porcelain / acrylic

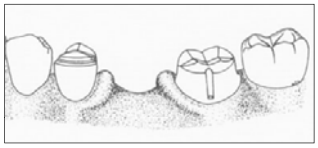
## Mechanical Considerations

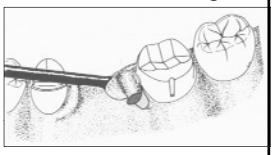


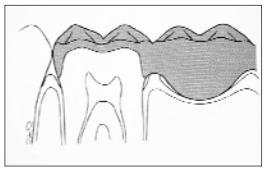
- Strength: O-G thickness of pontic / connector
- Material: metal > metal-ceramic > ceramic
- Position: straight line as possible
- Occlusion: normal centric contacts
  - Occlusal table commensurate with occlusion
  - Narrowing pontic ≠ decreased occlusal force

## <u>Surgical Ridge Correction</u>:

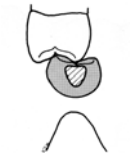
**Cuff of tissue** adjacent to edentulous space
Removal allows ↑connector size / cleaning



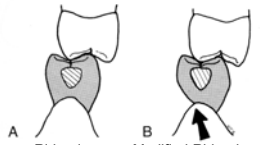




## Pontic Designs



Hygienic ("Sanitary")

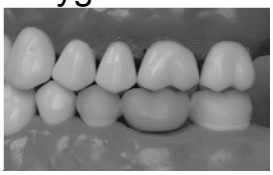


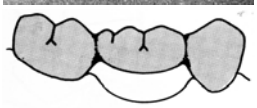

Ridge-lap  Modified Ridge-lap

Conical

Ovate

## Hygienic Pontic (Non-Esthetic)



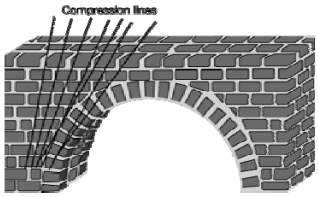


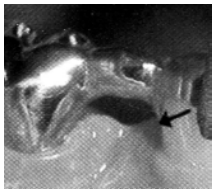
- (PRO) Easily cleaned
- (CON) Entrapment of food debris

- No contact with the residual ridge
- ~2-3mm space between apical portion of pontic and ridge
  - (tissue proliferation if too close)
- At least 3mm thick for strength (O-C)
- Convex contour FL / MD ("fishbelly)

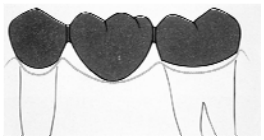
## Modified Hygienic Pontic ("Perel")

- Increased strength in connectors
- Decreased deflection with decreased O-C height

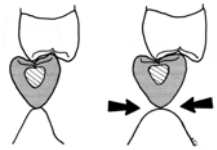


## Conical Pontic



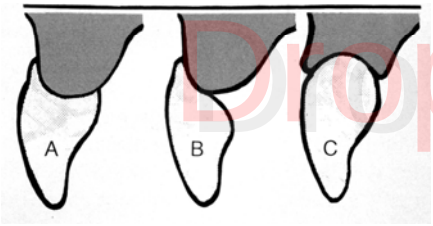
- Small convex area of contact at center of ridge.
  - Easy to clean / comfortable for patient
- Facial / lingual contours depend on residual ridge width



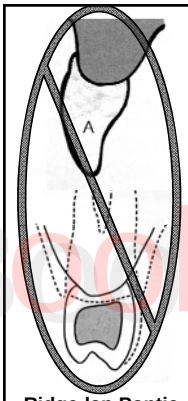
Contraindication:
Point contact w/ broad ridge → food entrapment

## Esthetic Pontic Designs

- Ridge Lap
- Modified Ridge Lap
- Ovate

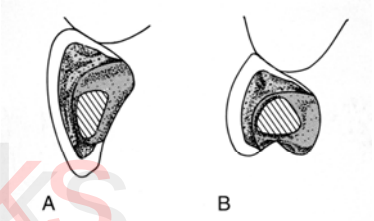




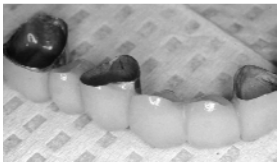

**Ridge-lap Pontic: Not cleansable**

## Modified Ridge Lap Pontic

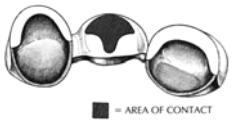



Combines esthetics with easy cleaning

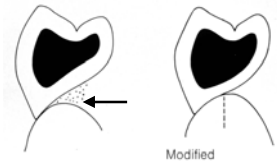
## Modified Ridge Lap Pontic

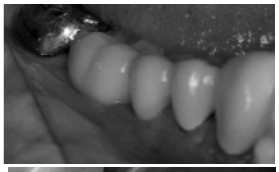


- Ridge contact on the facial half of ridge
- Contour of tissue-contacting area is convex
- (Slight faciolingual concavity on facial side of ridge)
- Tissue contact resembles a "T"

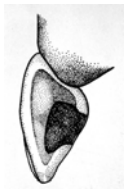


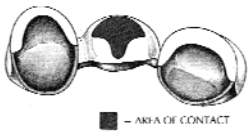

## Intimate tissue contact on facial half helps prevent debris accumulation

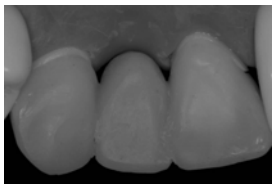


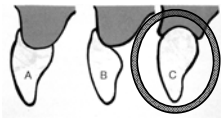
## Tissue Contact of Maxillary FPD

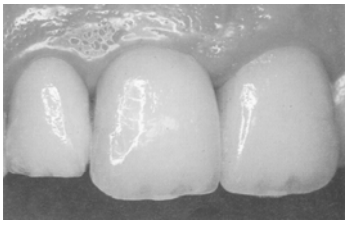




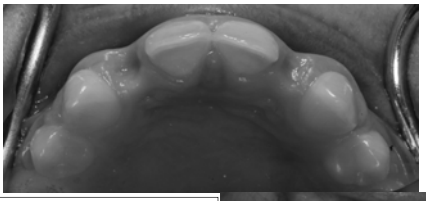
## Ovate Pontic Design



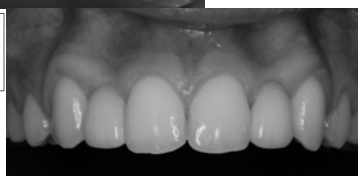



- Blunt / rounded apex set into ridge concavity
- Requires broad flat (rounded) ridge
- Concavity formed by:
  - Immediate provisional restoration
  - Surgical creation

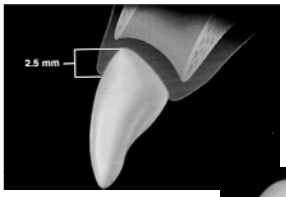
## Surgical Correction for Ovate Pontics: Gingivoplasty - ridge concavity / pontic convexity

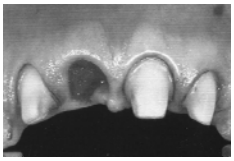


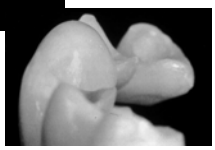
All-Ceramic Resin-Bonded FPDs
#6-8 and #9-11
Lawrence Brecht, DDS
ACP Prosthopedia



## Ovate Pontic: Immediate Provisional FPD

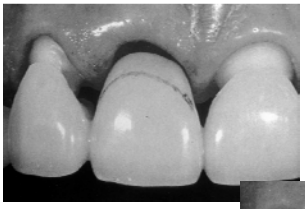




- Facial contour extends 2.5 mm apical to FGM
  - reduced to 1mm – 1.5mm at 4 weeks

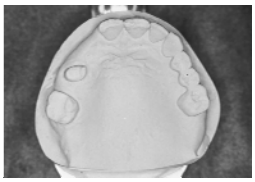
## Ovate Pontic: Immediate Provisional FPD

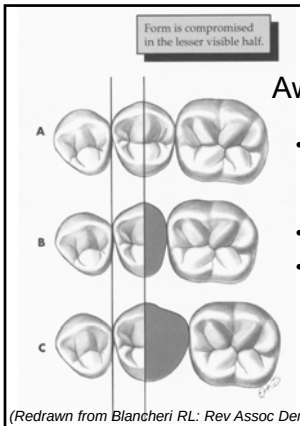


May wait ~6 months before tissue stabilizes and final restoration is fabricated.

## Pre-Treatment Assessment

- Pontic Space
  - M-D space (tipping)
  - I-G space (supraeruption)
  - Orthodontics
  - Diagnostic Waxing
- Residual Ridge Contour
  - Pontic modifications
  - Surgical modifications
  - Gingival architecture preservation






## Awkward Pontic Spaces

- Duplicate the dimension of the more visible mesial half of the adjacent tooth.
- (B) Narrow space
- (C) Wide space

*(Redrawn from Blancheri RL: Rev Assoc Dent Mex 8:103, 1950.) in Rosenstiel: Contemporary Fixed Prosthodontics.*

## Pontic Modifications: "Black Triangles" – open embrasures / resorption


- Unesthetic loss of interdental papillae with ridge resorption
- Plaque accumulation / phonetic difficulties
- Interference with flossing

## Pontic Modifications: Excessive Length

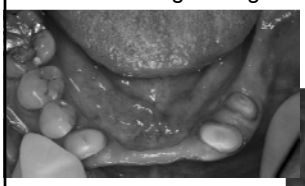

- Vertical resorption requires excessive pontic length
- Contour retainers / pontics normally; shape and stain pontic extension to simulate root surface.



## Esthetic Modifications of Pontic Contour

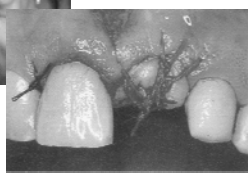

- Apparent shortening of crown with cervical shading
- Pink porcelain to simulate gingivae
- Decreased embrasure space with cervical contouring

## Pontic Modification: Embrasure filled with porcelain Narrow faciolingual ridge width - Mandibular



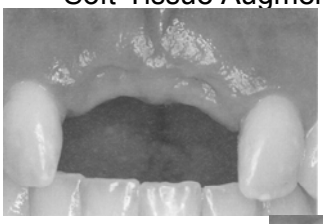

- Esthetic problems (?)
- Cleansability usually not a problem

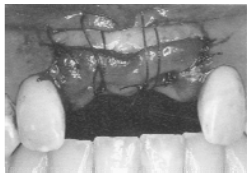
## Soft Tissue Augmentation Surgery

Hard tissue grafts - implants
Connective tissue grafts:
(subepithelial / submucosal)

## Soft-Tissue Augmentation Surgery





Vertical resorption would require excessive pontic length of centrals (length : width too great)

Chiche & Pinault

## (Post-surgical) Soft Tissue Augmentation Restoration

Balance
- Tooth length:width
- Central:Lateral proportion

Chiche & Pinault

## Management of deficient ridge with shaded gingival porcelain

Malament, KA and Neeser, S
Dent Clin N Am 2004 735-44

FPD #6-11 inserted 1982

Residual ridge resorption presented 2000

## Pink Porcelain Simulation Gingiva

(Implant Abutments)

## "Andrews Bridge"

Fixed retainers are connected by a rectangular bar which follows the curve of the ridge.

Denture teeth in an acrylic resin flange that clips over and is stabilized by the bar.